

Missouri Department of Natural Resources

Total Maximum Daily Load Information Sheet

Peruque Creek

Waterbody Segment at a Glance:

County: Warren
St. Charles
Nearby Cities: Wright City
Foristell
Wentzville
Length of Impairment: 12.5 miles
Pollutant: Non-Volatile Suspended Solids (NVSS)
Pollutant Sources: Urban and Rural Non-Point Sources (runoff)

Note: Added to the 2002 303(d) list



State map showing location of watershed

TMDL Priority Ranking: Medium

Description of the Problem

Beneficial uses of Peruque Creek

- Livestock and Wildlife Watering
- Protection of Warm Water Aquatic Life
- Protection of Human Health associated with Fish Consumption

Use that is impaired

- Protection of Warm Water Aquatic Life

Standards that apply

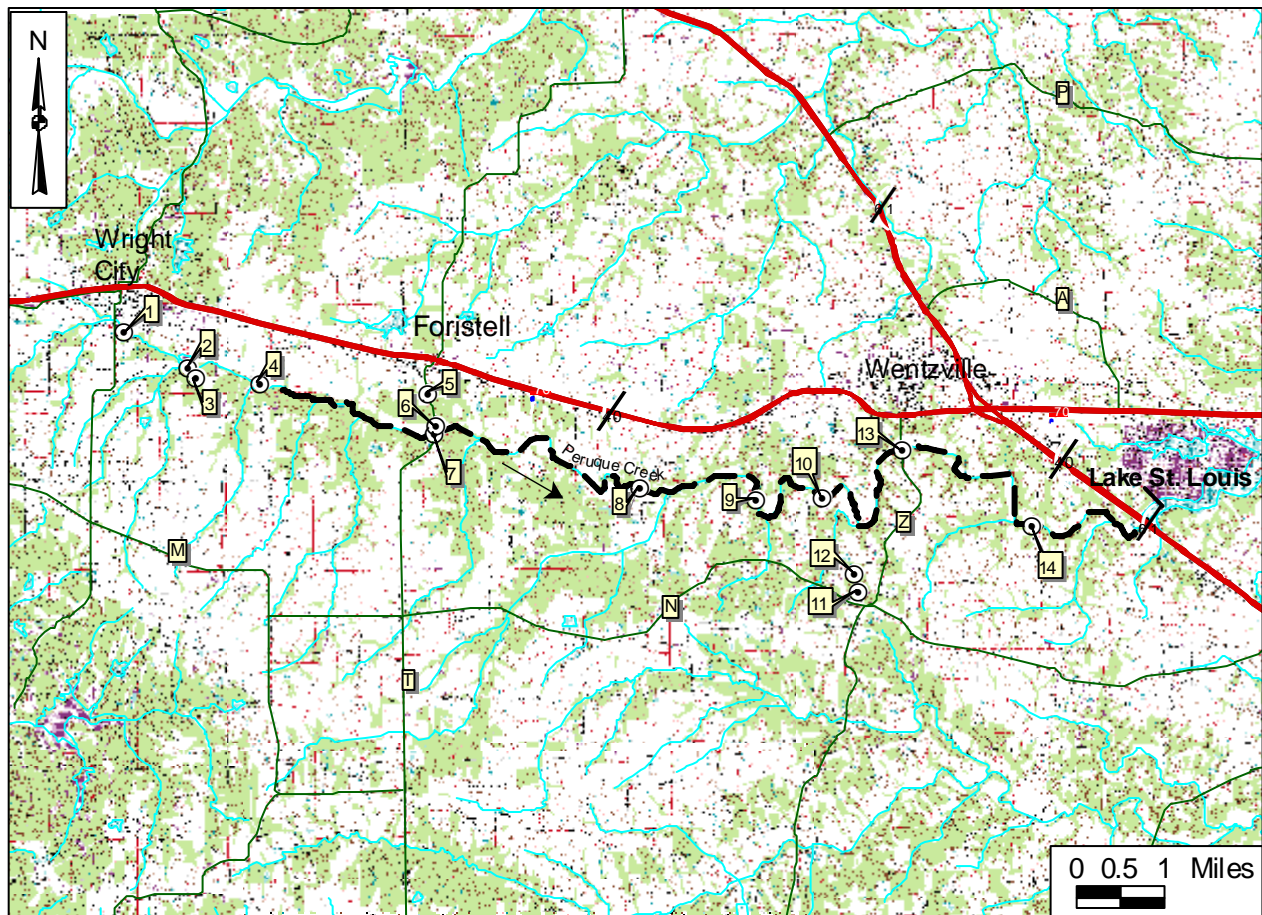
- All waterbodies in Missouri are protected by the *general* criteria (standards) contained in Missouri's WQS, 10 CSR20-7.031(3). These criteria (also called *narrative* criteria) list substances that all waters "shall be free from". The sections that apply to Peruque Creek are (A), (C) and (G) and they state:
 - Waters shall be free from substances in sufficient amounts to cause the formation of putrescent, unsightly or harmful bottom deposits or prevent full maintenance of beneficial uses.
 - Waters shall be free from substances in sufficient amounts to cause unsightly color or turbidity, offensive odor or prevent full maintenance of beneficial uses.
 - Waters shall be free from physical, chemical or hydrologic changes that would impair the natural biological community.

Background Information and Water Quality Data

Rapid rates of sedimentation in upper Lake St. Louis suggest that excess erosion and high sediment loads are a problem in Peruque Creek upstream of the lake. This was the basis for adding Peruque Creek to the 2002 303(d) list. The impairment is listed as Non-Volatile Suspended Solids (NVSS). This term covers the silt, sand or gravel that is associated with erosion and sedimentation.

In 2000, Missouri Water Quality Monitoring (WQM) volunteers collected water quality data at three sites along Peruque Creek upstream of Lake St. Louis (see map below). Sampling occurred from April through July 2000. Volunteers sampled the water for temperature (Temp in degrees Celsius), dissolved oxygen (DO), specific conductance (SC), total solids (TS), total dissolved solids (TDS), turbidity (Turb), and pH. Each sampling site was visited four times for pH and six times for all other constituents with one exception – only five turbidity measurements were reported for Hepperman Road. This data is summarized in Table 1 (see next page).

Sampling Sites on Peruque Creek in St. Charles County, Missouri



| Table 1. Mean Water Quality Data Collected by Volunteers, April –June 2000 | | | | | | | |
|---|-------------------|--------------------|------------------|--------------------|---------------------|---------------------|-------------------|
| Site # Location | Temp C | DO mg/L | SC us | TS mg/L | TDS mg/L | Turb NTU | pH* SU |
| 9. Hepperman Road | 20 | 7.5 | 458 | 181.5 | 228.3 | 12.8 | 7.9 |
| 10. Wilmer Road | 20 | 7.8 | 447 | 207.2 | 215.3 | 14.0 | 8.0 |
| 14. Duello Road | 20 | 6.8 | 448 | 247.9 | 221.7 | 20.2 | 7.9 |
| * Median | | | | | | | |

In 2002, the Department of Natural Resources and the Department of Conservation conducted an extended water quality monitoring effort on the portion of Peruque Creek upstream of Lake St. Louis. This data is summarized in Table 2.

| Table 2. Mean Water Quality for Peruque Creek and Tributaries 2002 (number of samples averaged are in parentheses) | | | | | | | | | | |
|--|--------------------------------------|---------------------|---------------------|--------------|----------------------|--------------------------|---------------------|---------------------------------|---------------------------------|--------------------|
| # | Location | TSS mg/L | VSS mg/L | Turb. | D.O. mg/L | Cond umhos/cm | KJN mg/L | NH₃N mg/L | NH₃N mg/L | TP mg/L |
| 1 | Peruque Cr. at Wright City | 12.5 (8) | <5 (8) | 41.6 (1) | 4.1 (9) | 653 (9) | 0.54 (9) | 0.04 (9) | <.05 (9) | 0.09 (9) |
| 2 | Wright City WWTP | 12.1 (8) | 4.06 (8) | | 6.5 (8) | 1019 (8) | 2.95 (8) | 0.07 (8) | 0.11 (8) | 1.33 (8) |
| 3 | Trib. 0.1 mi. below Wright City WWTP | 16.4 (9) | 5.39 (9) | | 5.1 (9) | 1020 (9) | 2.86 (9) | 0.03 (9) | 0.18 (9) | 1.26 (9) |
| 4 | Peruque Cr. at Archer Rd. | 62.1 (9) | 2.81 (8) | 143 (2) | 8.1 (10) | 895 (10) | 1.68 (10) | <.05 (10) | 0.22 (10) | 0.55 (10) |
| 5 | Foristell WWTP | 7.2 (5) | <5 (5) | | 4.3 (5) | 1041 (5) | 0.52 (5) | <.05 (5) | 8.80 (5) | 3.82 (5) |
| 6 | Trib. from Foristell WWTP | 17.8 (7) | <5 (7) | | 9.2 (7) | 927 (7) | 0.68 (7) | <.05 (7) | 2.72 (7) | 1.86 (7) |
| 7 | Peruque Cr. at Hwy T | 86 (26) | 10.5 (27) | 93.9 (19) | 8.8 (26) | 482 (25) | 0.87 (26) | .05 (26) | 0.14 (26) | 0.11 (26) |
| 8 | Peruque Cr. at Prairie Point Rd. | 37.6 (23) | 6.5 (23) | 38.4 (16) | 8.6 (21) | 408 (21) | 0.56 (21) | 0.04 (20) | 0.15 (21) | 0.09 (21) |
| 9 | Peruque Cr. at Hepperman Rd. | 129.7 (15) | 13.8 (15) | 65.5 (15) | 7.3 (14) | 451 (13) | 0.53 (14) | <.05 (14) | 0.15 (14) | 0.08 (14) |
| 10 | Peruque Cr. at Wilmer Rd. | 8.7 (9) | <5 (8) | 19.2 (2) | 8.3 (10) | 392 (10) | 0.40 (10) | <.05 (10) | 0.07 (10) | 0.05 (10) |
| 11 | Castlegate WWTP | 6.6 (9) | 3.2 (9) | | 4.9 (9) | 918 (9) | 14.5 (9) | 8.15 (9) | 5.88 (9) | 4.45 (9) |
| 12 | Trib. from Castlegate WWTP | 5.6 (8) | <5 (8) | | 5.2 (8) | 914 (8) | 12.8 (8) | 8.56 (8) | 5.65 (8) | 4.26 (8) |
| 13 | Peruque Cr. at Hwy Z | 12.3 (8) | <5 (8) | | 6.4 (8) | 426 (8) | 0.45 (8) | <.05 (7) | <.05 (8) | 0.05 (8) |
| 14 | Peruque Cr. at Duello Rd. | 13.9 (9) | <5 (9) | 32 (2) | 7.2 (10) | 403 (10) | 0.41 (10) | <.05 (10) | 0.10 (10) | 0.07 (10) |

Source: Missouri Department of Natural Resources and Missouri Department of Conservation

Total Suspended Solids (TSS), Volatile Suspended Solids (VSS, i.e. organic matter), and Turbidity data all suggest the middle section of Peruque Creek has the highest levels of suspended sediment. However, these stations were sampled more frequently and contain data from stormwater events not sampled at other stations. The conductivity (Cond), Kjeldahl nitrogen (KJN), ammonia nitrogen (NH₃N), nitrate nitrogen (NO₃N) and total phosphorus (TP) all show that the upper portions of Peruque

Creek are more affected by wastewater discharges (Wright City and Foristell) than the lower sections of the stream near Lake St. Louis.

Assessment of aquatic habitat and sampling of aquatic macroinvertebrate communities on Peruque Creek were done in 2002 by the Department of Natural Resources. Six sites on Peruque Creek were evaluated. Four sites were considered to have good riparian land use practices and two sites had obvious soil erosion problems. The mean habitat quality scores for these sites were 109 percent of mean reference habitat scores, indicating good habitat quality. Spring invertebrate sampling showed the upper and middle portions of the creek to be slightly impaired and the lower section of the creek in good condition. Fall sampling showed all but the uppermost part of Peruque Creek (which had almost no water at that time) to be in good condition. There were no observed differences in the habitat scores or the aquatic invertebrate communities between the four sites with good riparian land use and the two sites with obvious erosion problems. Observation of the stream at many locations noted large areas of bedrock on the bottom of the stream and areas with very coarse gravel or cobble substrate, all of which indicate the presence of occasional scouring flows that would prevent the deposition of fine sediments in the stream. These observations may explain the lack of impact in the immediate area where serious soil erosion problems were occurring.

These observations appear to be supported by measurements of fine sediment (sand and silt) deposition taken that same year. Table 3 summarizes this data. The data suggests that the upper portion of the creek, which has the smallest amount of watershed, is less subject to high flow events and scour, and therefore has a greater amount of fine sediment deposition in the stream. As the watershed becomes larger, the impact of high flows and scour become greater and the amount of fine sediments in the stream become progressively less.

| Table 3. Percent Fine Sediment Deposition at Six Locations in Peruque Creek, 2002 | |
|--|--|
| Location | Percent Sand and Silt in Streambottom* |
| Ruge Park, Wright City | 63 |
| Archer Road | 28 |
| Highway T | 27 |
| Hepperman Road | 30 |
| Wilmer Road | 8 |
| Duello Road | 12 |

Note: In this region of the state, values for sand and silt deposition in streambottoms of up to 30 percent are considered normal.

The studies conducted in 2002 suggest that neither water quality changes caused by wastewater discharges nor fine sediment deposition caused by soil erosion are significant problems on this portion of Peruque Creek. Aquatic invertebrate monitoring data was not conclusive and further monitoring of the aquatic invertebrate community is planned.

The local community (including several environmental groups) is active and involved regarding the health of Peruque Creek. WQM volunteers and Missouri Lakes Volunteer Program participants continue to collect data. The Peruque Watershed Alliance, formed in August 2001, is composed of residents and stakeholders, staff and members of Peruque Creek Watershed communities and interested people from St. Charles and Warren counties. The Alliance worked on a watershed plan for

Peruque Creek. The plan laid out objectives and strategies to minimize and prevent future impacts to natural resources, residents and communities in St. Charles and Warren counties.

In the spring of 2002, the city of Lake St. Louis received a grant from the U.S. Environmental Protection Agency for a special study on Peruque Creek. The consulting firm of Camp Dresser and McKee (CDM) was hired to conduct the study to try and define the challenges to the creek regarding water quality and to suggest solutions to protect the creek as a healthy waterbody. In the course of the study, they attempted to gather and review all available data pertaining to Peruque Creek. They then identified gaps in the data and conducted sampling to fill those gaps. The results of this study, along with CDM's recommendations, have been compiled in a report due out in November 2004. The Alliance will be responsible for implementing the CDM recommendations. An important component of their strategy is public education to increase awareness of the environment in general and the Peruque Creek watershed in particular.

For more information call or write:

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